Division of Biostatistics, DSI
Medical College of Wisconsin Presents

Scalable Smoothing in High Dimensions with BART

By: Sameer Deshpande, PhD

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Tuesday, October 8th | 3:30PM - 4:30PM
Location: MEB M2050-M2070

Bayesian Additive Regression Trees (BART) is an easy-to-use and highly effective nonparametric regression model that approximates unknown functions with a sum of binary regression trees (i.e., piecewise-constant step functions). Consequently, BART is fundamentally limited in its ability to estimate smooth functions. Initial attempts to overcome this limitation replaced the constant output in each leaf of a tree with a realization of a Gaussian Process (GP). While these elaborations are conceptually elegant, most implementations thereof are computationally prohibitive, displaying a nearly cubic per-iteration complexity. We propose a version of BART built with trees that output linear combinations of ridge functions and utilize non-axis-aligned splits. We are developing a new MCMC sampler that updates trees in linear time. Our proposed model includes a random Fourier feature-inspired approximation to treed GPs as a special case. More generally, our proposed model can be viewed as an ensemble of local neural networks, which combines the representational flexibility of neural networks with the uncertainty quantification and computational tractability of BART.

Sameer Deshpande, PhD

Sameer is an Assistant Professor in Statistics. Originally from Dallas, TX, he has spent the last decade on the East Coast. Prior to Wisconsin, he spent three years at a postdoc with Prof. Tamara Broderick at MIT and completed his Ph.D. and the Wharton School under the supervision of Profs. Ed George and Veronika Rockova.

His research interests include Bayesian hierarchical modeling, treed regression, model selection, and causal inference with applications in public health and sports. In his free time, he enjoys cooking, making cocktails, and photography. He is a long-suffering but unapologetic fan of Dallas professional sports teams and you can usually find him wearing a giant Texas belt buckle.

Please contact Gabrial Williams for additional event information at gwilliams@mcw.edu.